



01/13/97

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of :

Robert M. LORENCE ET AL. :

Serial No.: 08/260,536<sup>Pd</sup> :

Filed: June 16, 1994 :

For: **METHODS FOR TREATING AND DETECTING CANCER  
USING VIRUSES**

**RECEIVED**

JAN 15 1997

Group (Art Unit) 1813

Examiner: L. Scheiner

I hereby certify that this correspondence is being deposited  
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Washington, D.C. 20231 Oct. 20 1997

Name: Richard J. Leventz  
Signature: [Signature]  
Date: Jan 9, 1997

#24  
H.G.J  
1/15/97

**DECLARATION UNDER 37 CFR § 1.132 OF DR. MARK PEEPLES**

I, Mark Peeples, declare and state as follows:

1. I reside at 1906 South Maple Avenue, Berwyn, Illinois 60402.
2. I am presently a Professor at Rush Medical College, Chicago, Illinois 60402.

Currently, I am a visiting scientist at the Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland.

3. In 1974, I received a Bachelor of Arts in Biology and German from Heidelberg College, Tiffin, Ohio. In 1978, I received a Doctor of Philosophy in Immunology and Microbiology from Wayne State University, Detroit, Michigan. In 1978, I began my postdoctoral studies on Newcastle disease virus ("NDV") at the University of Massachusetts Medical School in Worcester, Massachusetts. I have worked with NDV for the past 18 years, and continue to do so.

4. My complete academic background and professional experience are set forth in my curriculum vitae, a copy of which is attached as Exhibit A.

5. I have conducted considerable research relating to Newcastle Disease Virus as reflected in the many publications I have written in this area.

6. I have read and considered the specifications corresponding to U.S. Application Serial Nos. 08/055,519 and 08/260,536, filed on April 30, 1993 and June 16, 1994, respectively ("patent applications"). These applications describe, among other things, methods of treating and detecting cancer in mammals using Paramyxoviruses, such as Newcastle Disease Virus ("NDV").

7. It is my opinion, as an expert in NDV, that the above-mentioned patent applications necessarily convey to one of skill in the art the concept of treating cancer in a mammal with a "mesogenic" NDV. My opinion is based on the following paragraphs:

8. NDV is categorized into three distinct classes according to its effects on chickens and chicken embryos. "Low virulence" strains are referred to as lentogenic and take 90 to 150 hours to kill chicken embryos at the minimum lethal dose (MLD); "moderate virulence" strains are referred to as mesogenic and take 60 to 90 hours to kill chicken embryos at the MLD; "high virulence" strains are referred to as velogenic and take 40 to 60 hours to kill chicken embryos at the MLD. See, e.g., Hanson and Brandly, Science, 122:156-157, 1955 and Dardiri et al., Am. J. Vet. Res., 918-920, 1961.

9. The patent applications describe NDV as useful to treat and detect cancer in mammals. Since the entire NDV class is comprised of lentogenic, mesogenic, and velogenic, the disclosure in the patent application necessarily conveys to one of skill in the art that each of these three categories is inherently included. On this basis alone, I conclude that the patent applications clearly communicate to the skilled worker that mesogenic NDV is employable for treating cancer in mammals.

10. This is particularly strongly the case for mesogenic NDV.

(a) The patent applications specifically exemplify a mesogenic NDV strain to treat cancer. Example 3, page 18 of 08/055,519, and Example 3, page 27 of 08/260,536, describe tumor regression after administration of NDV strain M (Mass-MK107). NDV strain M (Mass-MK107) is well known to be a mesogenic type of Newcastle Disease Virus. See, e.g., Schloer and Hanson, *J. Virol.*, 2:40-47, 1968. Consequently, it would have been necessarily understood by one of skill in the art that mesogenic strains are specifically included in the methods of treatment described in the patent applications.

(b) Although the specific term "mesogenic" is not expressly recited in the patent applications, a synonym for it is mentioned. In the legend to Figure 5 on page 6 of 08/055,519 and page 6 of 08/260,536 it is stated that "Figure 5 illustrates the effectiveness of a strain (M, Mass MK107) of relatively moderate virulence with that of a strain of high virulence (73-T) in causing tumor regression." (Emphasis added.) As discussed above, "mesogenic" is used to identify NDV viruses possessing "moderate virulence" on a relative scale. In Dardiri et al., *supra*, it is stated: "The variations in

virulence are described by the terms 'lentogenic,' low virulence; 'mesogenic,' moderate virulence; and 'velogenic,' high virulence." The latter two definitions are the exact phrases used in the patent applications.

As can be seen, mention of the mesogenic strain M and use of the synonym "moderate virulence" particularly clearly communicate the concept of using mesogenic NDV to treat cancer.

11. In sum, it is my conclusion upon reading the patent applications that the concept of treating cancer in a mammal employing a "mesogenic" strain of NDV is at least inherently, if not explicitly, described.

Further declarant says that all statements made herein are of his own knowledge true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: \_\_\_\_\_

November 12, 1986

Mark Peebles

Mark Peebles

## **CURRICULUM VITAE**

### **MARK EDWARD PEEPLES, Ph.D.**

**BUSINESS  
ADDRESS:**

Department of Immunology/Microbiology  
Rush-Presbyterian-St. Luke's Medical Center  
1653 West Congress Parkway  
Chicago, Illinois 60612  
Telephone: (312) 942-8736  
FAX: (312) 942-2808

**HOME  
ADDRESS:**

1906 South Maple Avenue  
Berwyn, Illinois 60402  
Telephone: (708) 795-1236

**PERSONAL:**

Born: September 26, 1952  
Married, no children  
Social Security Number: 197-42-5399  
Passport Number: 070832663

**PROFESSIONAL  
POSITIONS:**

|   |                |
|---|----------------|
| <b>Postdoctoral Fellow</b>  | <b>1978-80</b> |
| <b>Instructor</b>   | <b>1980-83</b> |
| Department of Molecular Genetics and Microbiology<br>University of Massachusetts Medical School<br>Worcester, Massachusetts |                |

|                            |                |
|----------------------------|----------------|
| <b>Assistant Professor</b> | <b>1983-88</b> |
| <b>Associate Professor</b> | <b>1988-92</b> |
| <b>Professor</b>           | <b>1993-</b>   |

Department of Immunology/Microbiology,  
Rush Medical College and  
Division of Immunology, Graduate College  
Rush University, Chicago, Illinois

|  |              |
|--|--------------|
| <b>Member</b>  | <b>1986-</b> |
| Division of Cell Biology, Graduate College<br>Rush University, Chicago, Illinois |              |

|  |              |
|--|--------------|
| <b>Head</b>  | <b>1989-</b> |
| Section of Virology<br>Department of Immunology/Microbiology<br>Rush Medical College, Rush University<br>Chicago, Illinois |              |

|   |                |
|---|----------------|
| <b>Associate Scientist</b>                        | <b>1989-92</b> |
| <b>Scientist</b>                                  | <b>1993-</b>   |
| Rush-Presbyterian-St. Luke's Medical Center Staff |                |

|                                       |              |
|---------------------------------------|--------------|
| <b>Associate Chairman</b>             | <b>1990-</b> |
| Department of Immunology/Microbiology |              |
| Rush Medical College, Rush University |              |
| Chicago, Illinois                     |              |

|   |                |
|---|----------------|
| <b>Sabbatical</b>                                     | <b>1995-96</b> |
| Laboratory of Infectious Diseases                     |                |
| National Institute of Allergy and Infectious Diseases |                |
| National Institutes of Health, Bethesda, Maryland     |                |
| Working with Peter Collins                            |                |

|                   |                                  |                |
|-------------------|----------------------------------|----------------|
| <b>EDUCATION:</b> | <b>Bachelor of Science</b>       | <b>1970-74</b> |
|                   | Biology and German               |                |
|                   | Heidelberg College, Tiffin, Ohio |                |

|  |                |
|--|----------------|
| <b>Doctor of Philosophy</b>                                  | <b>1974-78</b> |
| Immunology and Microbiology                                  |                |
| Dissertation with Dr. Seymour Levine                         |                |
| Wayne State University School of Medicine, Detroit, Michigan |                |

|   |                |
|---|----------------|
| <b>Postdoctoral Studies</b>                                 | <b>1978-83</b> |
| with Dr. Michael A. Bratt, Department of Molecular Genetics |                |
| and Microbiology, University of Massachusetts               |                |
| Medical School, Worcester, Massachusetts                    |                |

|                |  |                 |
|----------------|--|-----------------|
| <b>HONORS:</b> | DeVlieg Fellowship                                       | <b>1975-76</b>  |
|                | NIH Postdoctoral Fellowship                              | <b>1978-81</b>  |
|                | NIH Research Career Development Award                    | <b>1988-93</b>  |
|                | Certificate of Recognition, Rush Sigma Xi Club           | <b>1991</b>     |
|                | Listed in "Marquis Who's Who in Science and Engineering" | <b>1993, 96</b> |

|                  |  |                      |
|------------------|--|----------------------|
| <b>TEACHING:</b> | <b>Course Director</b>                 |                      |
|                  | Microbiology Concepts, Medical College | <b>1985-90</b>       |
|                  | Animal Virology, Graduate College      | <b>1984,86,91,95</b> |
|                  | Basic Microbiology, Graduate College   | <b>1987</b>          |
|                  | Loyola Medical School: Virology Unit   | <b>1990</b>          |
|                  | Virus Mimicry, Graduate College        | <b>1993</b>          |

|  |              |
|--|--------------|
| <b>Lecturer</b>  |              |
| Microbiology Concepts, Medical College                               | <b>1984-</b> |
| (including lab section and facilitating small group problem solving) |              |

|  |         |
|--|---------|
| Animal Virology, Graduate College  | 1984-   |
| Basic Microbiology, Graduate College   | 1987    |
| Host Defense, Graduate College   | 1987,90 |
| Molecular Cell Biology, Graduate College   | 1988-   |
| Microbiology, Medical College Alternative Curriculum                                 | 1988-   |
| Medical Technology Virology, College of Health Sciences                              | 1986-94 |
| Virology Course, Department of Micrology and Immunology, Northwestern Medical School | 1991    |
| Virology Course, Department of Microbiology and Immunology, Loyola Medical School    | 1992    |
| Molecular Biology, Graduate College  | 1994-   |

|                    |   |         |
|--------------------|---|---------|
| <b>ORGANIZING:</b> | Virology Research/Journal Club  | 1983-95 |
|                    | Immunology/Microbiology-Infectious Disease Joint Conferences                          | 1989-95 |
|                    | Immunology/Microbiology Seminar Series  | 1990-92 |
|                    | Molecular Biology Working Group   | 1991-   |
|                    | American Cancer Society, Institutional Research Grant; Application and Administration | 1991-95 |

|                              |   |         |
|------------------------------|---|---------|
| <b>COMMITTEE MEMBERSHIP:</b> | <b>University</b>   |         |
|                              | University Committee on Research  | 1987-90 |
|                              | University Research Week Committee  | 1989-   |
|                              | Search Committee for Chairperson of the Department of Religion and Health | 1989-90 |
|                              | Liaison Committee on Medical Education, Research Subcommittee             | 1990    |
|                              | Scientific Misconduct Investigation Committee                             | 1994-   |
|                              | Student Affairs Committee   | 1994-95 |
|                              | <b>Medical College</b>  |         |
|                              | Medical College Faculty Council   | 1989-93 |
|                              | Research Task Force   | 1991    |
|                              | Search Committee for Chairperson of the Department of Preventive Medicine | 1990-91 |
|                              | Search Committee for Chairperson of the Department of Internal Medicine   | 1992-93 |
|                              | Search Committee, Dean of the Medical College                             | 1994    |
|                              | Head, Pharmacology/Immunology Faculty Search Committee                    | 1994    |
|                              | <b>Graduate College</b>   |         |
|                              | Graduate College Council  | 1989-94 |
|                              | Search Committee for Head of the Division of Cell Biology                 | 1989    |

|   |               |
|---|---------------|
| Chairman, Graduate College Curriculum Committee   | 1991-94       |
| <b>Department</b>   |               |
| Faculty Search Committee, Chairman  | 1984,88,91-92 |
| Graduate Advisory Committee   | 1984-87       |
| Department Advisory Committee   | 1985-         |
| Faculty Search Committee  | 1994          |
| Student Dissertation Advisory Committees (23)   | 1983-         |
| as Chairman (5)   |               |
| as Advisor (7)  |               |
| as Co-Advisor (1)   |               |
| as Member (5)   |               |
| in another department (4)   |               |
| in another institution (4)  |               |
| <b>National, State, Local</b>   |               |
| Associate Editor, <u>Virology</u>   | 1987-         |
| Special NIH Study Section: Programs of Excellence in Basic Research in AIDS   | 1988          |
| Research Committee, American Cancer Society, Illinois Division  | 1988-93       |
| Judge, Chicago Area Science Fair  | 1988-         |
| Convenor of the Hepatitis B Virus Workshop  |               |
| Annual American Society for Virology Meeting  | 1990-92       |
| Member of a National Cancer Institute Review Committee: Program Project Site Visits   | 1991,92       |
| Founding Member, Steering Committee, Chicago Area Virology Association  | 1992-95       |
| Ad hoc Member/Reviewer Reserve  |               |
| Experimental Virology Study Section, NIAID, NIH   | 1993,95,96    |
| Ad hoc Member of the Virology Study Section, NIH  | 1993          |
| Member, National Board of Medical Examiners Microbiology Test Committee, and United States Medical Licensing Examination Step 1 Material Development Committee for Microbiology | 1994-97       |
| Ad hoc grant reviews for the National Institutes of Health, National Science Foundation, Veteran's Administration, U.S. Department of Agriculture, and Illinois Cancer Council  |               |
| Ad hoc manuscript reviews for the <u>Journal of Virology</u> , <u>Journal of General Virology</u> , <u>Virus Research</u> and <u>Viral Immunology</u>                           |               |

**PROFESSIONAL** American Society for Virology

**SOCIETIES:** American Society for Microbiology

American Association for the Advancement of Science

Society for General Microbiology

Sigma Xi: Secretary, Rush University Club

1986-88

**EXTERNAL  
RESEARCH  
SUPPORT:****Igen, Inc.****07/01/84 - 12/30/84****\$22,650**

Principal Investigator: Mark E. Peeples, Ph.D.

"Pseudotype Virus Containing the Hepatitis B Glycoprotein: Development and Use"

**National Institutes of Health (RO1 AI 21924)****07/01/85 - 06/30/88****\$235,405 Direct Costs**

Principal Investigator: Mark E. Peeples, Ph.D.

"Structural/Functional Mapping of the NDV Matrix Protein"

**American Cancer Society, Illinois Division (#85-47)****10/15/85 - 01/14/87****\$35,000**

Principal Investigator: Mark E. Peeples, Ph.D.

"A Receptor for Hepatitis B Virus on Cultured Cells"

**American Cancer Society, Illinois Division (#87-10)****01/15/87 - 03/14/88****\$35,000**

Principal Investigator: Mark E. Peeples, Ph.D.

"Identification of the Hepatitis B Virus Receptor on Cultured Cells"

**National Institutes of Health (RO1 AI 25586)****07/01/88 - 06/30/93****\$332,007 Direct Costs**

Principal Investigator: Mark E. Peeples, Ph.D.

"Identification of a Cell Receptor for Hepatitis B Virus"

**National Institutes of Health (KO4 AI 00908)****07/01/88 - 06/30/93****\$234,000 Direct Costs**

Research Career Development Award

Principal Investigator: Mark E. Peeples, Ph.D.

"Identification of a Cell Receptor for Hepatitis B Virus"

**National Institutes of Health (RO1 AI 29606)****04/01/90 - 03/31/95****\$450,033 Direct Costs**

Principal Investigator: Mark E. Peeples, Ph.D.

Co-Principal Investigator: Kailash C. Gupta, Ph.D.

"NDV M Protein: Virion Assembly and Nuclear Location"

**Analytab Products Incorporated, Diamedix****07/01/89 - 06/30/90****\$12,500**Principal Investigators: Mark Peeples, Ph.D., Jeffrey Nelson, M.D.,  
and Matthew Bankowski, Ph.D.

"Western Blot in the Diagnosis of Lyme Disease"

**Cytel Corporation**



**09/01/90 - 08/31/91**

**\$50,000**

Principal Investigator: Mark E. Peeples, Ph.D.

"The Hepatitis B Virus Receptor as an Antiviral Agent"

**National Science Foundation**

**02/01/93-07/1/96**

**\$10,950**

Principal Investigator: Mark E. Peeples, Ph.D.

Co-Principal Investigator: Jeffrey J. Gorman, Ph.D.

"U.S. Australia Cooperative Research: Interactions between the Two Polypeptides of the Paramyxovirus Fusion Proteins"

**National Institutes of Health (Continuation of RO1 AI 25586)**

**9/01/95 - 8/31/98**

**\$452,055 Direct Costs**

Principal Investigator: Mark E. Peeples, Ph.D.

"Identification of a Cell Receptor for Hepatitis B Virus"

#### **INVITED PRESENTATIONS AT OTHER INSTITUTIONS:**

1. Evidence for a Hepatitis B Virus Receptor. Merck Sharpe & Dohme Research Laboratories, West Point, PA, October, 1986.
2. Is There More Than One Receptor for Hepatitis B Virus? Abbott Laboratories, Abbott Park, IL, July, 1987.
3. Does Hepatitis B Virus Have Two Receptors? Department of Immunology and Microbiology, Wayne State University School of Medicine, Detroit, MI, April, 1988.
4. The Paramyxovirus Matrix Protein: Assembly Band Leader and Nucleolar Groupie. Department of Biological Chemistry and Structure, The Chicago Medical School, North Chicago, IL, May, 1989.
5. The Paramyxovirus Matrix Protein: Band Leader of Assembly and Nucleolar Groupie. Department of Microbiology and Immunology, Indiana University School of Medicine, Indianapolis, IN, May, 1989.
6. Hepatitis B Virus: Is One Receptor Enough? Department of Microbiology and Immunology, University of Illinois at Chicago College of Medicine, March, 1990.
7. Hepatitis B Virus: Evidence for Two Receptors. Cytel Corporation, La Jolla, CA, March, 1990.
8. A Novel Receptor for Hepatitis B Virus. Department of Microbiology-Immunology, Northwestern Medical School, Chicago, IL, March, 1990.
9. Hepatitis B Virus: Would You Pick Up This Hitchhiker? Biology Department, Purdue University, Calumet, IN, March, 1990.
10. Hepatitis B Virus May Be a Hitchhiker. Department of Medical Microbiology, University of Alberta, Edmonton, Alberta, Canada, June, 1990.
11. The Hepatitis B Virus Receptor for Hepatocytes May Be a Lipoprotein, Heidelberg University, Heidelberg, Germany, September, 1990.
12. Hepatitis B Virus Receptor: An Apolipoprotein Hitchhiker? Department of Microbiology and Immunology, Loyola University, Strich School of Medicine, Maywood, IL, October, 1990.
13. A Hepatitis B Virus Binding Protein: Is It the Receptor? Biology Department, Purdue University, Calumet, IN, April, 1991.
14. The Paramyxovirus Fusion Glycoprotein, menage a deux au trois? Chicago Medical School, North Chicago, IL, March, 1992.

15. The Paramyxovirus Fusion Protein: Menage a deux au trois? University of Massachusetts Medical Center, Worcester, Mass., May, 1992.
16. Molecular Biology of Newcastle Disease Virus. Kalamazoo College, Kalamazoo, Michigan, October, 1992.
17. Signals Controlling Nuclear Localization of the Newcastle Disease Virus Matrix Protein. Biomolecular Research Institute, Parkville, Victoria, Australia, February, 1993.
18. Virus Attachment and Entry: Paramyxoviruses and Hepadnaviruses. Northern Illinois University, DeKalb, Illinois, February, 1994.
19. How to Identify a Virus Receptor. Pro-Virus Incorporated, Rockville, Maryland, March, 1995.
20. Hepatitis Viruses. Associated Colleges of the Chicago Area, Argonne National Laboratory, Illinois, April, 1995.
21. In Search of the Hepatitis B Virus Receptor. Biology Department, Purdue University, Calumet, IN, April, 1995.
22. Apolipoprotein H: Potential Hepatitis B Virus Receptor. Biomolecular Research Institute, Melbourne, Australia. October, 1995.

#### **PUBLICATIONS:**

1. Levine, S., Peeples, M. and Hamilton, R. 1977. The effect of respiratory syncytial virus infection on HeLa-cell macromolecular synthesis. *J. Gen. Virol.*, **37**:53-63.
2. Peeples, M.E. 1978. Studies on the polypeptide structure, the metabolic requirements for maturation, and persistence of respiratory syncytial (RS) virus in HeLa cell culture: Doctoral Dissertation.
3. Peeples, M. and Levine, S. 1979. Respiratory syncytial virus polypeptides: their location in the virion. *Virology* **95**:137-145.
4. Peeples, M. and Levine, S. 1980. Metabolic requirements for the maturation of respiratory syncytial (RS) virus. *J. Gen. Virol.* **50**:81-88.
5. Peeples, M.E. and Levine, S. 1981. Characteristics of a persistent respiratory syncytial virus infection in HeLa cells. *Virology* **113**:141-149.
6. Peeples, M.E. and Bratt, M.A. 1982. UV irradiation analysis of complementation between, and replication of, RNA-negative temperature-sensitive mutants of Newcastle disease virus. *J. Virol.* **41**:965-973.
7. Peeples, M.E. and Bratt, M.A. 1982. Virion functions of RNA<sup>+</sup> temperature-sensitive mutants of Newcastle disease virus. *J. Virol.* **42**:440-446.
8. Peeples, M.E., Rasenas, L.L. and Bratt, M.A. 1982. RNA synthesis by Newcastle disease virus temperature-sensitive mutants in two RNA-negative complementation groups. *J. Virol.* **42**:996-1006.
9. Peeples, M.E., Glickman, R.L. and Bratt, M.A. 1983. Thermostabilities of virion activities of Newcastle disease virus: evidence that the temperature-sensitive mutants in groups B, BC, and C have altered HN proteins. *J. Virol.* **45**:18-26.
10. Peeples, M.E. and Bratt, M.A. 1984. Mutation in the matrix protein of Newcastle disease virus can result in decreased fusion glycoprotein incorporated into virion particles and decreased infectivity. *J. Virol.* **51**:81-90.

11. Morrison, T.G., Peeples, M.E. and McGinnes, L.W. 1987. Conformational change in a viral glycoprotein during maturation due to disulfide bond disruption. *Proc. Natl. Acad. Sci., U.S.A.* **84**:1020-1024.
12. Peeples, M.E., Komai, K., Radek, R. and Bankowski, M.J. 1987. A cultured cell receptor for the small S protein of hepatitis B virus. *Virology* **160**:135-142.
13. Faaberg, K.S. and Peeples, M.E. 1988. Strain variation and nuclear location of the Newcastle disease virus matrix protein. *J. Virol.* **62**:586-593.
14. Peeples, M.E. 1988. Differential detergent treatment allows immunofluorescent localization of the matrix protein of Newcastle disease virus within the nucleus of infected cells. *Virology* **162**:255-259.
15. Komai, K., Kaplan, M. and Peeples, M.E. 1988. The Vero cell receptor for the hepatitis B virus small S protein is a sialoglycoprotein. *Virology* **163**:629-634.
16. Peeples, M.E., Glickman, R.L., Gallagher, J.P. and Bratt, M.A. 1988. Temperature-sensitive mutants of Newcastle disease virus altered in HN glycoprotein size, stability, or antigenic maturity. *Virology* **164**:284-289.
17. Faaberg, K.S. and Peeples, M.E. 1988. Association of the soluble matrix protein of Newcastle disease virus with liposomes is independent of ionic conditions. *Virology* **166**:123-132.
18. Pontisso, P., Petit, M.-A., Bankowski, M.J. and Peeples, M.E. 1989. Human liver membranes contain receptors for the hepatitis B virus pre-S1 region and, via polymerized human serum albumin, for the pre-S2 region. *J. Virol.* **63**:1981-1988.
19. Niles, W.D., Peeples, M.E. and Cohen, F.S. 1990. Kinetics of virus-induced hemolysis measured for single erythrocytes. *Virology* **174**:593-598.
20. Nelson, J.A., Bankowski, M.J., Newton, B.J., Benson, C.A., Kaplan, R., Landau, W., Trenholme, G.M. and Peeples, M.E. 1990. Detection of antibodies in late lyme disease. *J. Infect. Dis.* **161**:1034-1035.
21. Komai, K. and Peeples, M.E. 1990. Hepatitis B virus surface antigen particles are internalized by Vero cells. *Virology* **177**:332-338.
22. Nelson, J.A., Bouseman, J.K., Kitron, U., Callister, S.M., Harrison, B., Bankowski, M.J., Peeples, M.E., Newton, B.J. and Anderson, J.F. 1991. Isolation and characterization of *Borrelia burgdorferi* from Illinois *Ixodes dammini*. *J. Clin. Microbiol.* **29**:1732-1734.
23. Mehdi, H., Nunn, M., Steel, D.M., Whitehead, A.S., Perez, M., Walker, L. and Peeples, M.E. 1991. Nucleotide sequence and expression of the human gene encoding apolipoprotein H (B2-glycoprotein I). *Gene* **108**:293-298.
24. Nelson, J.A., Wolf, M.D., Yuh, W.T.C. and Peeples, M.E. 1992. Cranial nerve involvement with Lyme borreliosis demonstrated by magnetic resonance imaging. *Neurology* **42**:671-673.
25. Peeples, M.E., Wang, C., Gupta, K.C. and Coleman, N. 1992. Nuclear entry and nucleolar localization of the Newcastle disease virus (NDV) matrix protein occurs early in infection and does not require other NDV proteins. *J. Virol.* **66**:3263-3269.
26. Wang, C., Raghu, G., Morrison, T. Peeples, M.E. 1992. Intracellular processing of the paramyxovirus F protein: critical role of the predicted amphipathic alpha helix adjacent to the fusion domain. *J. Virol.* **66**:4161-4169.
27. Reichard, K.W., Lorence, R.M., Cascino, C.J., Peeples, M.E., Walter, R.J., Fernando, M.B., Reyes, H.M. and Greager, J.A. 1992. Newcastle disease virus selectively kills human tumor cells. *J. Surg. Res.* **52**:448-453.
28. Wolf, M.D., Folk, J.C., Nelson, J.A. and Peeples, M.E. 1992. Acute posterior multifocal placoid pigment epitheliopathy and Lyme disease. (Correspondence) *Arch. Ophthalmol.* **110**:750.

29. Sergel, T., McGinnes, L.W., Peeples, M.E. and Morrison, T.G. 1993. The attachment function of the Newcastle disease virus hemagglutinin-neuraminidase protein can be separated from fusion promotion by mutation. *Virology* **193**:717-726.
30. Reichard, K.W., Katubig, B.B., Reyes, H.M., Peeples, M.E. and Lorence, R.M. 1993. Retinoic acid enhances killing of neuroblastoma cells by Newcastle disease virus. *J. Ped. Surg.* **28**:1221-1226.
31. Coleman, N. and Peeples, M.E. 1993. The matrix protein of Newcastle disease virus localizes to the nucleus via a bipartite nuclear localization signal. *Virology* **195**:596-607.
32. Anderson, K.M., Peeples, M.E. Kessler, H., and Harris, J.E. 1993. Neither ETYA nor A63162 inhibit Newcastle disease, herpes simplex or simian virus 40 replication: implications for their mechanism of action. *Clin. Physiol. Biochem.* **10**:65-70.
33. Melikyan, G.B., Niles, W.D., Peeples, M.E. and Cohen, F.S. 1993. Influenza hemagglutinin-mediated fusion pores connecting cells to planar membranes: flickering to final expansion. *J. Gen. Physiol.* **102**:1131-1149.
34. Sellar, G.C., Keane, J., Mehdi, H., Peeples, M.E., Browne, N. and Whitehead, A.S. 1993. Characterization and acute phase modulation of canine apolipoprotein H ( $\beta$ 2-glycoprotein I). *Biochem. Biophys. Res. Comm.* **191**:1288-1293.
35. Mehdi, H., Kaplan, M.J., Anlar, F.Y., Yang, X., Bayer, R., Sutherland, K., and Peeples, M.E. 1994. Hepatitis B virus surface antigen binds to apolipoprotein H. *J. Virol.* **68**:2415-2424.
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#### GRADUATE STUDENT ADVISEES:

- Kay S. Faaberg. Antigenic Mapping and Model Membrane Association of the Newcastle Disease Virus Matrix Protein. 1982-1987, Ph.D.
- Matthew J. Bankowski. The Envelope Proteins of Hepatitis B Virus: Evidence for a New Protein and Identification of a Viral Attachment Protein. 1982-1988, Ph.D.
- Michael J. Kaplan. A Candidate Receptor for Hepatitis B Virus. 1985-1991, Ph.D.
- Natalie Coleman. Nuclear Localization of the Newcastle Disease Virus Matrix Protein. 1988-1992, Ph.D.
- Can Wang. Genetic Analysis of the Newcastle Disease Virus Fusion Protein. 1987-93, Ph.D.
- Karen Sutherland. Association Between Hepatitis B Virus and Apolipoprotein H in Chronically Infected Patients. 1988-

Lisa Scott. Identification of the Respiratory Syncytial Virus Receptor. 1991-  
Edgardo Ariztia. Hepatocyte Growth Factor-Induced Gene Expression in Liver Epithelial Cells.  
(Co-Advisor with Anand Iyer, Northwestern Medical College) 1992-  
Louay Hallak. Ribozyme against Hepatitis B Virus. 1994-

#### **POSTDOCTORAL TRAINEES/VISITING SCIENTISTS/RESIDENTS:**

Kazuo Komai, M.D. The Vero Cell Receptor for Hepatitis B Virus Small Surface Protein. 1986.  
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